

Fishery Data Series Number 97-4

Length Frequency and Age Distribution
of Resident Fish Collected from Rivers Within
Togiak National Wildlife Refuge, Alaska, 1996

Rob MacDonald
Biological Technician, Fisheries

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United States Department of the Interior
Fish and Wildlife Service
Togiak National Wildlife Refuge

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Matogak River, North Fork Goodnews River,
Ongivinuck River, Ongoke River, Osviak River,
Pungokepuk Creek, Togiak National Wildlife
Refuge, southwest Alaska

Togiak National Wildlife Refuge
U.S. Fish and Wildlife Service
P.O. Box 270
Dillingham, Alaska 99576
(907) 842-1063

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**Length Frequency and Age Distribution of Resident Fish Collected
from Rivers Within Togiak National Wildlife Refuge, Alaska, 1996**

ABSTRACT - Baseline age, weight and length (AWL) sampling of resident fish species was conducted by U.S. Fish and Wildlife Service field crews on seven creeks and rivers within the Togiak National Wildlife Refuge in 1996. A total of 670 rainbow trout, 349 Arctic grayling, 187 char, and 34 northern pike were sampled. All fish species were collected with hook and line methods. Rainbow trout in all creeks and rivers were marked with individually numbered Floy™ spaghetti tags. In addition, char sampled in the Osviak and Matogak Rivers were tagged. Two nominations to the Alaska Department of Fish and Game's Atlas of Waters Important to the Spawning, Rearing or Migration of Anadromous Fishes were submitted. Trip report summaries from the 1996 field season are included as appendices. The purpose of this report is to compile fisheries biological data and make it available to fisheries biologists and managers. All raw data summarized in this report are available in electronic format archived with the Alaska Department of Fish and Game and this office. Collections of AWL data previous to 1996 are compiled in other Refuge reports (Lisac 1996; Lisac and MacDonald 1995a; Lisac and MacDonald 1995b; Lisac and MacDonald 1996; MacDonald 1996a; MacDonald 1996b; and MacDonald 1997).

INTRODUCTION

The Togiak National Wildlife Refuge (Refuge) encompasses approximately 4.7 million acres in southwest Alaska (Figure 1). Fourteen drainages ranging in area from 130 to 5,200 km² (50 to 2,000 mi²) flow from the Refuge into Bristol and Kuskokwim Bays. One of the primary objectives of the Refuge is to conserve fish and wildlife populations and habitat in their natural diversity.

Freshwater fishes and anadromous salmon are important commercial, sport, and/or subsistence fishery resources within the Refuge. Rainbow trout (Oncorhynchus mykiss), Arctic grayling (Thymallus Arcticus), char (Salvelinus species), northern pike (Esox lucius), and the five species of Pacific salmon (Oncorhynchus species) are found throughout the Refuge. The Fisheries Management Plan (FMP) for the Refuge (USFWS 1990) documented species distribution throughout the Refuge and identified baseline population data gaps for resident species and anadromous char. Many waters are known to support resident fish populations, but baseline biological data are lacking. The U.S. Fish and Wildlife Service has an extensive field program centered around the major waterways of the Refuge. Throughout the ice-free season personnel make an effort to collect biological data from fishes caught by hook and line methods and from chinook salmon carcasses. Survey trips have been undertaken since 1991 to document baseline fisheries resource data (Lisac and MacDonald 1995b; Lisac and MacDonald 1996).

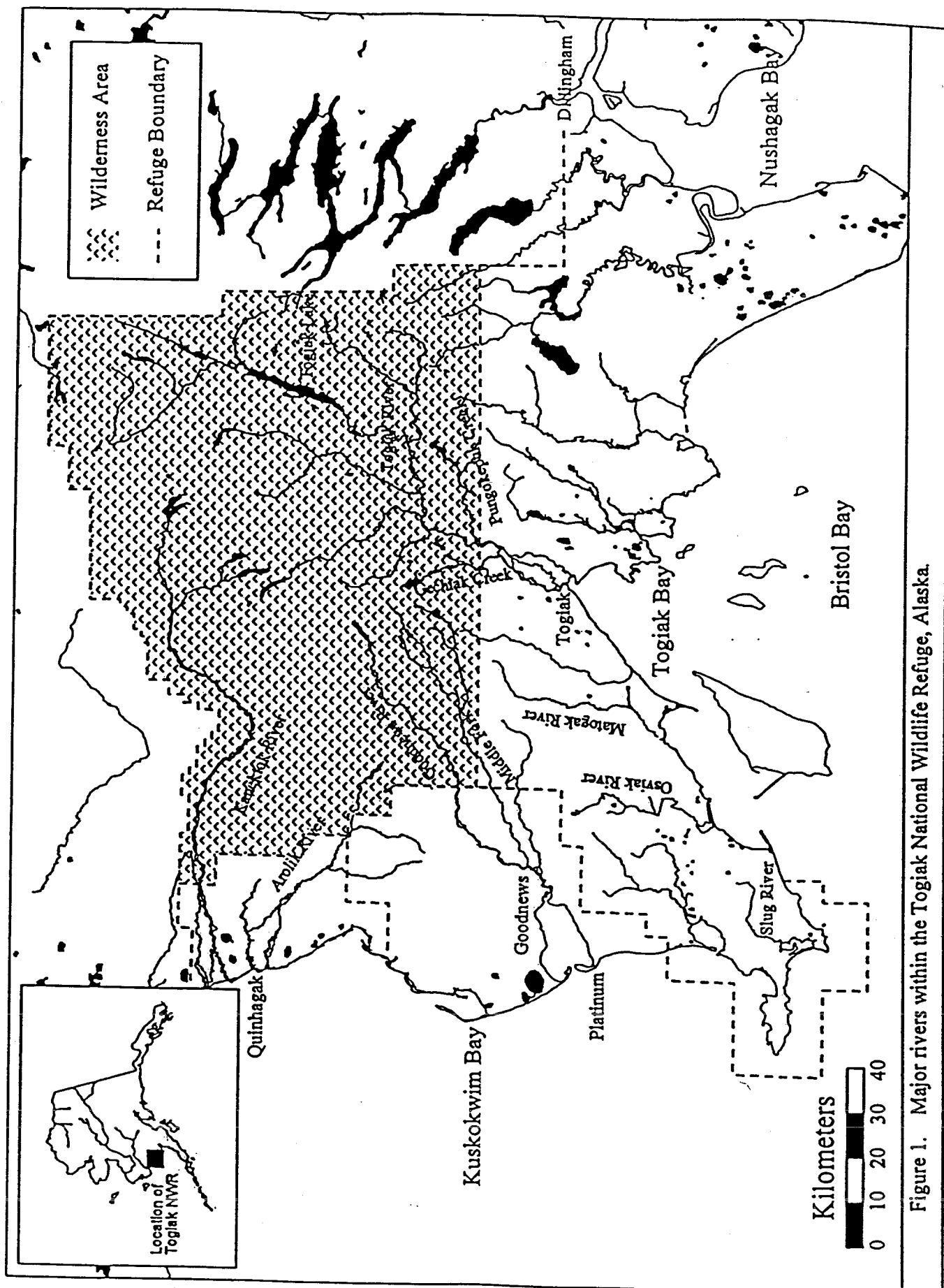


Figure 1. Major rivers within the Togiak National Wildlife Refuge, Alaska.

The objectives of this report are to:

1. Document the age, weight, and length distribution of rainbow trout, Arctic grayling, and other resident species in Refuge rivers vulnerable to sport fishing gear.
2. Compile this data on an annual basis and make available to resource managers in a standard format archived in the State Research and Technical Services (RTS) system.

Previously, resident species data has been presented for the Togiak River drainage (Lisac and MacDonald 1996), Arolik River (Lisac and MacDonald 1995b), and from 21 lakes within the Refuge (MacDonald 1996b). Chinook salmon escapement samples are reported separately in MacDonald (1997).

METHODS

Age, weight and length (AWL) data were collected from rainbow trout, Arctic grayling, char, and northern pike. Rainbow trout were of primary interest with other species sampled opportunistically. Age, sex and length (ASL) data were also collected from chinook salmon carcasses and these data are reported in MacDonald (1997). Sampling occurred on Pungokepuk and Gechiak Creeks and the Arolik, North Fork Goodnews, Kanektok, Matogak, Ongivinuck, Ongokey, and Osviak Rivers.

All fish were caught using hook and line and measured using standard AWL sampling as outlined in Clutter and Whitesel (1956). Scales from rainbow trout and Arctic grayling were collected from the left side of the fish in the preferred area (Jearld 1983). No scales were taken from char or pike. Fork length was measured to the nearest millimeter (mm), and weight was recorded to the nearest 25 grams (g). Rainbow trout having a length of 200 mm or greater were marked with individually numbered Floy™ spaghetti tags. Recaptured rainbow trout were measured for length and weight and scale samples were collected from the right side of the fish to avoid regenerated scales from the area where scales were previously collected. All data and any distinguishing characteristics were recorded on individual scale envelopes.

Since Dolly Varden and Arctic char (Salvelinus species) are difficult to positively identify without sacrificing, they are reported here together as char. Ages were not determined for char or northern pike. Char sampled in the Osviak and Matogak Rivers were marked with individually numbered Floy™ spaghetti tags.

Acetate impressions were made of scales using a hydraulic press (Dery 1983; Riffe 1994). All scales were aged using a Canon PC 70M microfiche copier with a forty-power lens via methods outlined in Mosher (1969), Coggins (1994), and Lux (undated). The scale reader made three independent age determinations for each scale sample. The modal age is then reported as suggested by Coggins (1994). Samples with no modal age are treated as unreadable and included

with regenerated scales as age unknown.

Data were transferred to Alaska Department of Fish and Game (ADFG) Standard Age Weight Length Mark-Sense Data Forms (Version 1.1) (ADFG 1990). Data forms were sent to ADFG Research and Technical Services for optical scanning. Each data set was assigned a file number which corresponds to the State fisheries management area, the species sampled, and the year of collection (Heineman 1989a) (Appendix A).

Completed data sets were analyzed using a crosstabulation program BBX2, developed by ADFG Research and Technical Services (Heineman 1989b). The BBX2 program produces unweighted estimates of mean length and percentage by age group and the associated standard error estimates following procedures outlined by Sokal and Rohlf (1981; Riffe 1994).

RESULTS

Scale samples, sex determinations, lengths and weights were collected from 670 rainbow trout, 349 Arctic grayling, 187 char, and 34 northern pike in seven creeks and rivers within the Togiak National Wildlife Refuge in 1996. Samples were collected from the Arolik, Matogak, Ongivinuck, Ongoke and Osviak Rivers and Gechiak and Pungokepuk Creeks. Analysis of chinook salmon escapement samples is published in a separate Fisheries Data Series Report (MacDonald 1997). A summary of resident species sampled by river, mean length and mean length by age group is presented in Table 1. Length frequency distributions for species by river with sample sizes greater than 20 are presented as Figures 2-8.

A small sample of grayling ($N = 5$) from Gechiak Creek ranged from 266 mm to 438 mm in length (mean 361 mm). Small sample sizes of rainbow trout were caught in the Ongivinuck ($N=2$) and Osviak Rivers ($N=5$). These rainbow trout ranged from 413 mm to 498 mm in length (mean 455 mm) in the Ongivinuck River and ranged from 541 mm to 570 mm in length (mean 555 mm) in the Osviak River.

Small sample sizes of char were caught in Gechiak ($N=17$) and Pungokepuk ($N=16$) Creeks and in the Ongoke ($N=16$) and Osviak Rivers ($N=10$). Gechiak Creek char ranged from 344 mm to 577 mm (mean 483 mm). Ongoke River char ranged from 378 mm to 513 mm in length (mean 443 mm). Osviak River char ranged from 425 mm to 609 mm (mean 512 mm). Pungokepuk Creek char ranged from 355 mm to 534 mm (mean 476 mm).

Trip reports were written after all sampling trips were completed. These summaries documented fisheries notes, wildlife notes and observations regarding river characteristics (Appendix B).

Two nominations to the Alaska Department of Fish and Game's Atlas of Waters Important to the Spawning, Rearing or Migration of Anadromous Fishes were submitted (Appendix C). Trips

Table 1. Sample size, mean length, range of lengths, and mean length at age of resident fish species, Togiak National Wildlife Refuge, Alaska, 1996.

Species / Location	Sample Size	Mean Length (mm)	Range (mm)	Sample size and mean length at age												
				Unknown	1	2	3	4	5	6	7	8	9	10	11	
<u>Rainbow trout</u>																
Arolik River	324	473	219-634	-	-	-	7 / 298	18 / 365	27 / 393	87 / 451	45 / 498	40 / 526	7 / 554	1 / 510	-	-
Gechiak Creek	237	369	181-713	-	14 / 221	31 / 293	-	123 / 348	14 / 394	21 / 453	6 / 487	8 / 556	2 / 539	-	-	-
Ongivinuck River	2	455	413-498	-	-	-	-	-	1 / 413	-	1 / 498	-	-	-	-	-
Osviak River	5	555	541-570	-	-	-	-	-	1 / 541	-	3 / 562	1 / 549	-	-	-	-
Pungokepuk Creek	102	461	184-760	-	3 / 199	6 / 314	29 / 392	15 / 460	26 / 508	9 / 599	3 / 543	2 / 601	-	-	1 / 652	-
<u>Arctic grayling</u>																
Arolik River	59	380	183-490	-	1 / 183	7 / 264	12 / 313	5 / 368	9 / 400	5 / 415	12 / 450	6 / 466	1 / 490	-	-	-
Gechiak Creek	5	361	266-438	-	-	1 / 266	3 / 366	-	-	-	1 / 438	-	-	-	-	-
Ongivinuck River	69	402	234-487	-	-	2 / 249	14 / 334	8 / 380	7 / 381	3 / 432	28 / 442	5 / 464	-	-	-	-
Ongoke River	152	408	275-473	-	-	1 / 275	3 / 332	12 / 367	43 / 394	39 / 412	34 / 432	6 / 439	2 / 438	-	-	-
Osviak River	40	416	355-480	-	-	-	3 / 374	9 / 395	17 / 411	4 / 441	6 / 457	-	-	-	-	-
Pungokepuk Creek	24	393	146-485	-	1 / 146	3 / 323	3 / 360	4 / 392	5 / 411	4 / 459	2 / 449	1 / 446	-	-	-	-
<u>Char</u>																
Arolik River	50	483	390-583	no ages available												
Gechiak Creek	17	483	344-577	no ages available												
Matogak River	25	457	345-625	no ages available												
Ongivinuck River	53	442	348-614	no ages available												
Ongoke River	16	443	378-513	no ages available												
Osviak River	10	512	425-609	no ages available												
Pungokepuk Creek	16	476	355-534	no ages available												
<u>Northern pike</u>																
Pungokepuk Creek	34	551	459-703	no ages available												

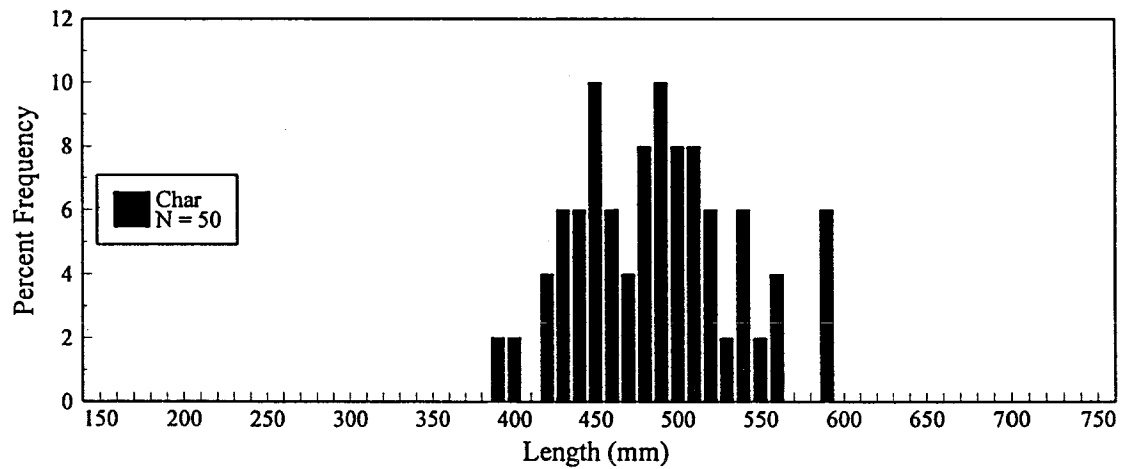
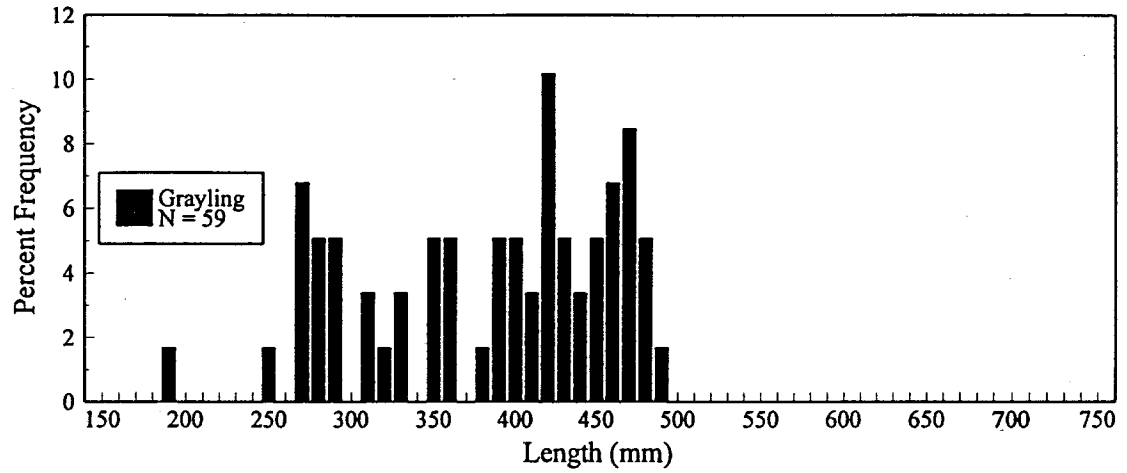
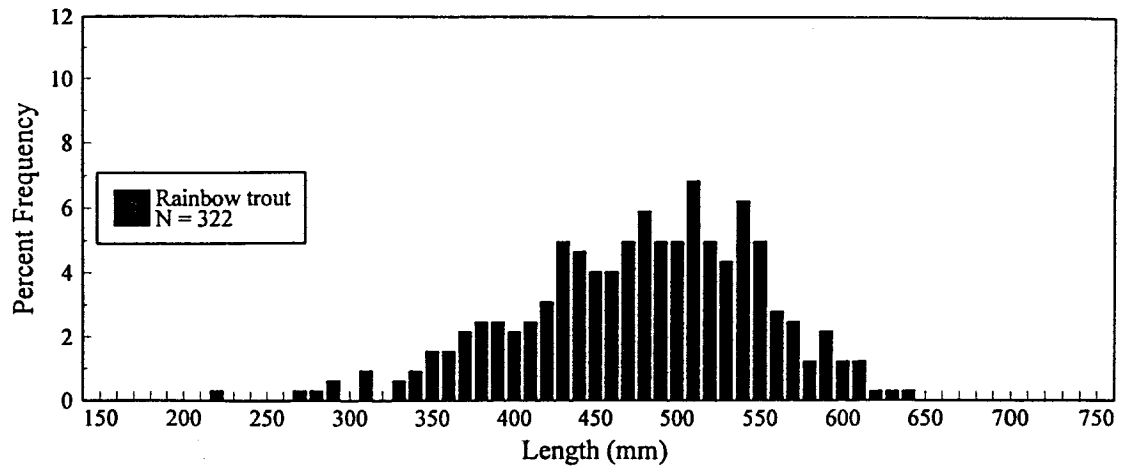


Figure 2. Fork length frequency distribution for rainbow trout, grayling and char in the Arolik River, Togiak National Wildlife Refuge, Alaska, 1996.

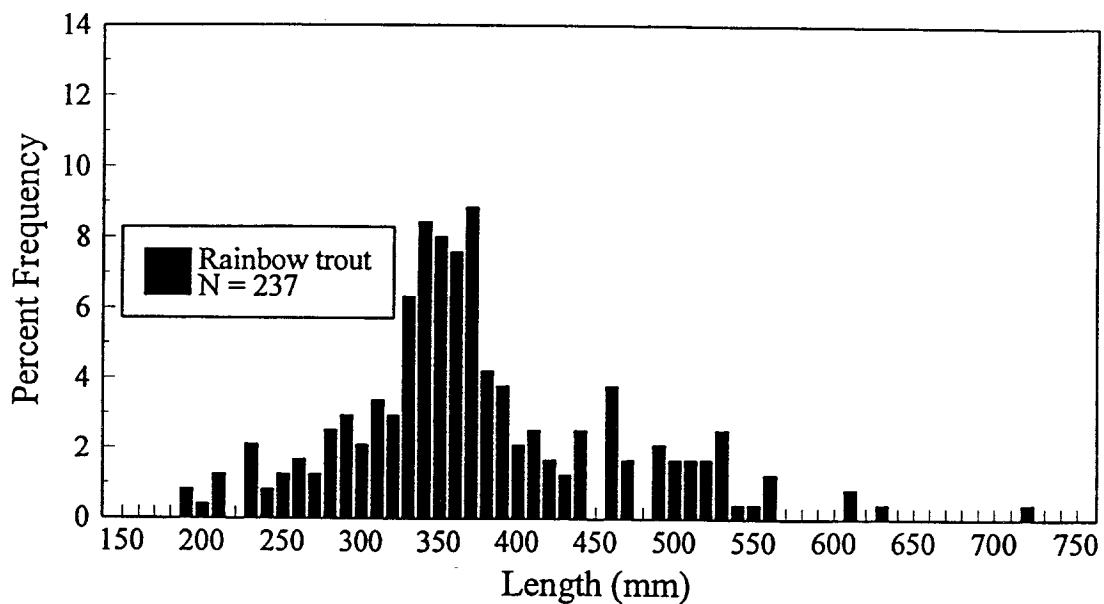


Figure 3. Fork length frequency distribution for rainbow trout in Gechiak Creek, Togiak National Wildlife Refuge, Alaska, 1996.

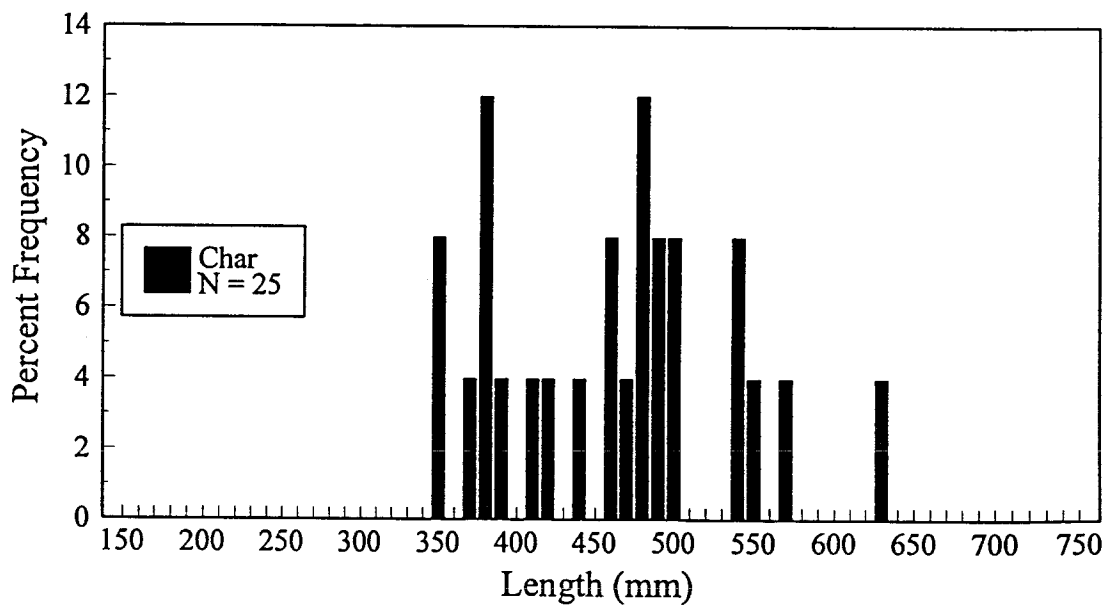


Figure 4. Fork length frequency distribution for char in the Matogak River, Togiak National Wildlife Refuge, Alaska, 1996.

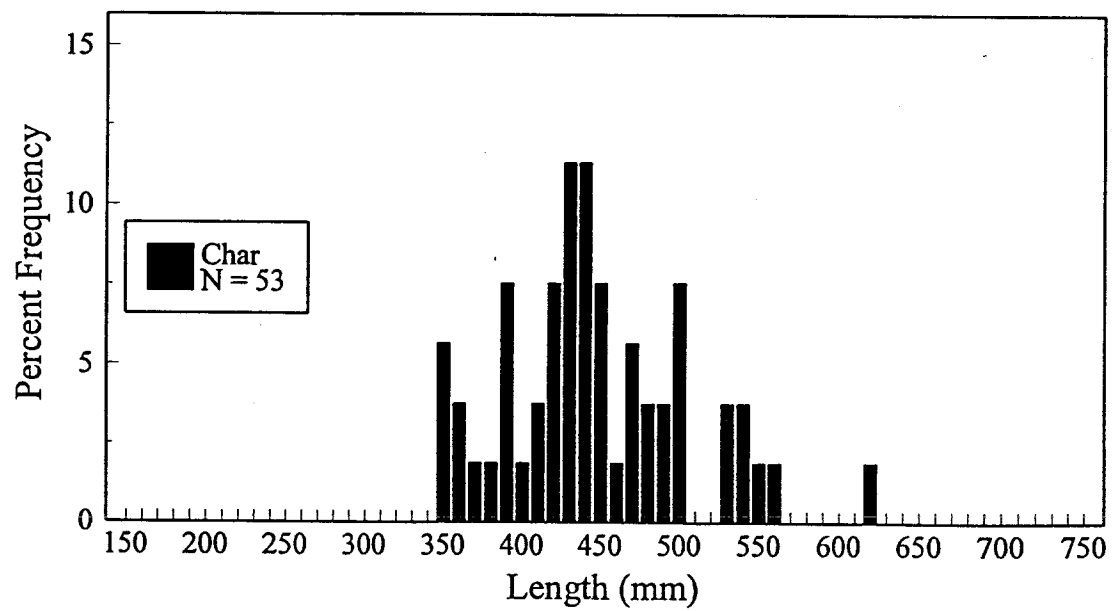
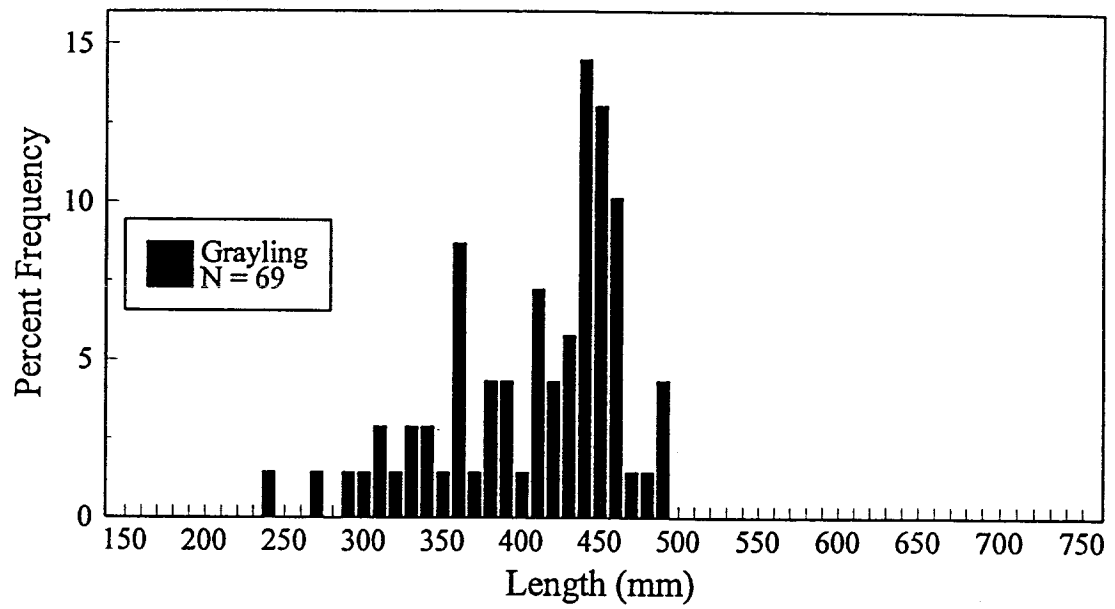


Figure 5. Fork length frequency distribution for grayling and char in the Ongivinuck River, Togiak National Wildlife Refuge, Alaska, 1996.

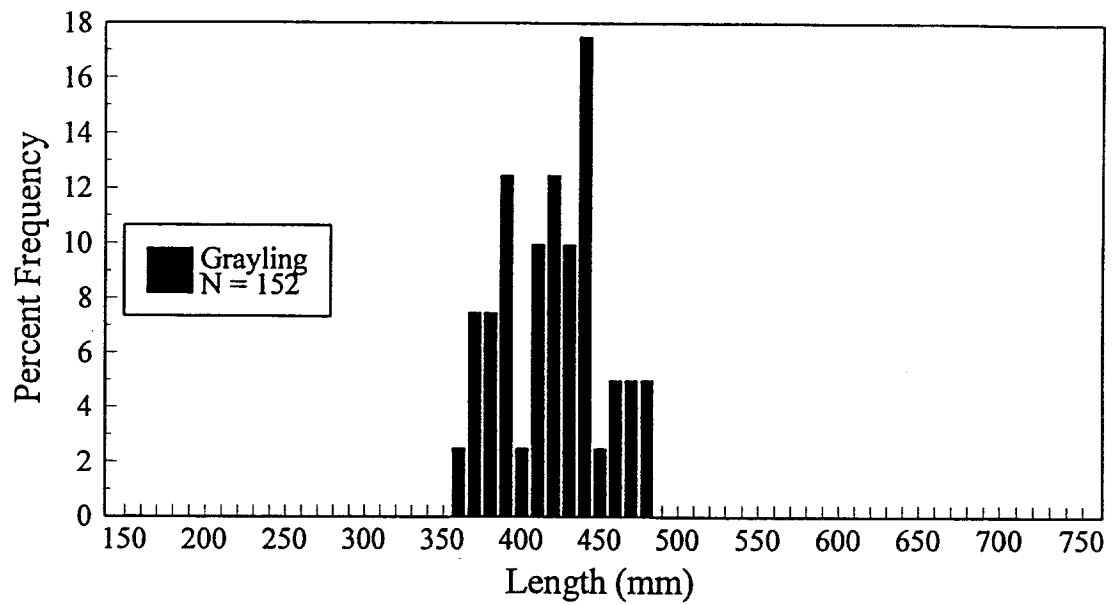


Figure 6. Fork length frequency distribution for grayling in the Ongoke River, Togiak National Wildlife Refuge, Alaska, 1996.

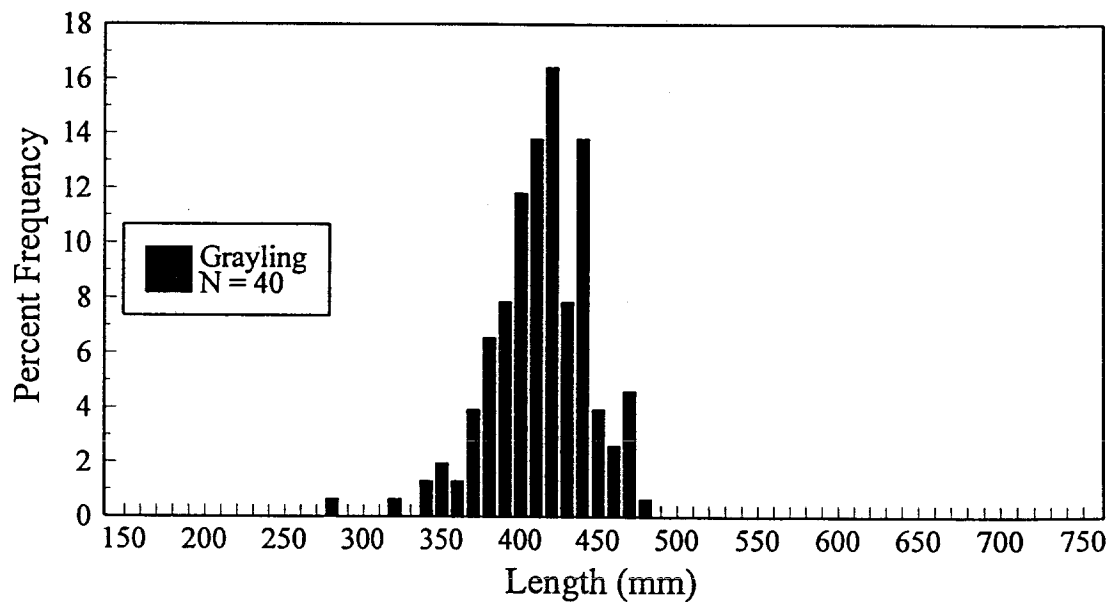


Figure 7. Fork length frequency distribution for grayling in the Osviak River, Togiak National Wildlife Refuge, Alaska, 1996.

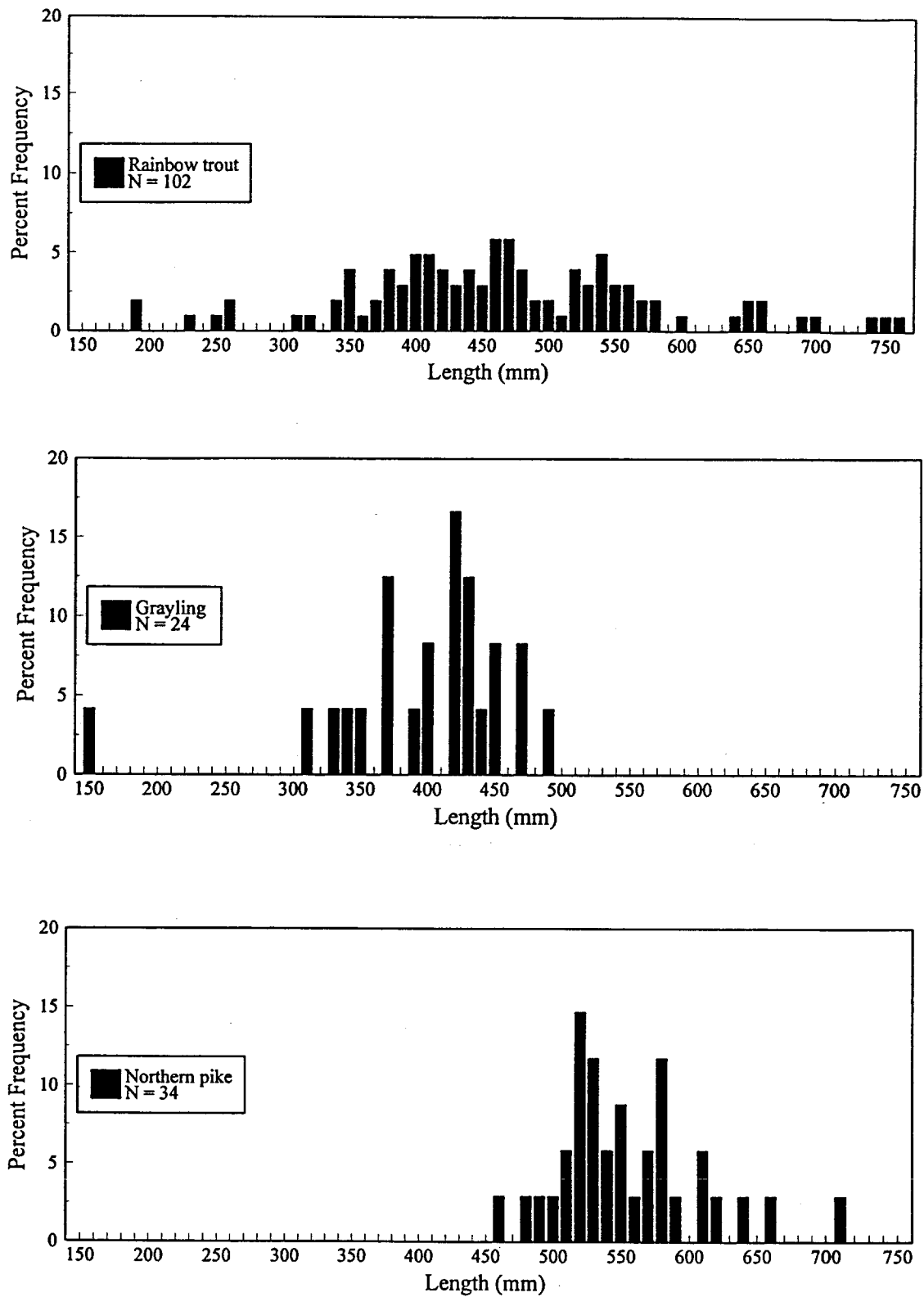


Figure 8. Fork length frequency distribution for rainbow trout, grayling and northern pike in Pungokebuk Creek, Togiak National Wildlife Refuge, Alaska, 1996.

down the Ongoke and Osviak Rivers revealed salmon species present that have not previously been documented by ADFG. Chinook and chum salmon were documented in the Ongoke River and sockeye salmon were documented in the Osviak River.

DISCUSSION AND RECOMMENDATIONS

Rainbow trout were found in all but two (Matogak and Ongoke Rivers) of the tributaries sampled for resident species in 1996. Sample sizes were small from the Ongivinuck and Osviak Rivers. It is not known if there is truly a lack of rainbow trout in these drainages or if this is a result of sampling methods or timing.

Rainbow trout sampled in 1996 have similar ranges of age and length as previous Refuge collections (Lisac and MacDonald 1995b; Lisac and MacDonald 1996), and to rainbow trout from tributaries of Kuskokwim Bay (Alt 1977).

This was the first attempt at sampling in the Osviak River and we did not know what to expect from the river. Low numbers of rainbow trout were expected from the Ongivinuck River since only five rainbow trout were captured during 1995 (Lisac and MacDonald 1996). Rainbow trout sample sizes were large from the Arolik River and from Gechiak and Pungokepuk Creeks. Large sample sizes have been acquired from these waters each of the past years they have been sampled (Lisac and MacDonald 1995b; Lisac and MacDonald 1996).

Arctic grayling were found in all but one (Matogak River) of the Refuge tributaries sampled in 1996. This was the first year of sampling for the Matogak River and it is not known if grayling are present. Sample sizes in most tributaries are small and don't indicate a large grayling population. This may be related to environmental conditions, fishing pressure or sampling techniques. Rainbow trout are the target species during fisheries trips with grayling and other resident species caught and sampled incidentally which likely reduces the grayling catch. The grayling catch in the Ongoke River was the largest ($N = 152$).

Arctic grayling sampled in Refuge drainages in 1996 have similar ranges of age and length as grayling sampled previously (Lisac and MacDonald 1996; Alt 1977).

Char were caught in each Refuge tributary sampled. This supports previous known occurrence and distribution of char throughout Refuge drainages (USFWS 1990), throughout the Togiak River drainage (Lisac and MacDonald 1996), the Arolik River (Refuge files), and observations made during a survey of tributary lakes conducted from 1987 to 1988 (MacDonald 1996b).

All char sampled in 1996 had similar size ranges as the char sampled previously on the Refuge (Lisac and MacDonald 1996; MacDonald 1996b) and to char sampled in tributaries of the Kuskokwim River (Alt 1977). No comparison of ages can be made between Refuge char with other drainages because aging structures were not collected. Scales from char are difficult to use

to determine ages and sacrificing the fish to collect otoliths was not a desired objective of this survey.

Northern pike were sampled only in Pungokepuk Creek. They are reported to occur in several other tributaries and lakes within the Togiak drainage (USFWS 1990) but were not found in the other tributary study areas. However, no sampling occurred in the lower Togiak River drainage where numerous unnamed lakes and ponds occur. During a lake survey project of Refuge lakes in 1987 and 1988 (MacDonald 1996b) northern pike were sampled only in Pungokepuk Lake and West Togiak Lake. West Togiak Lake has not been sampled since then.

Northern pike sampled in Pungokepuk Creek in 1996 were slightly larger than pike sampled previously in Pungokepuk Creek in 1993 and 1995 (Lisac and MacDonald 1996), and pike sampled in Pungokepuk Lake in 1988 (MacDonald 1996b). The 1996 samples did not contain any small pike as was found in tributaries of the Kuskokwim River in 1976 (Alt 1977). No comparison of length at age can be made between Pungokepuk Creek pike with other drainages because aging structures were not collected. Growth and age determinations from northern pike scales is made very difficult as a result of local conditions, rate of growth, circuli number and presence of several types of false circuli (Scott and Crossman 1973).

Angling has been an accepted method of capture for rainbow trout throughout southwest Alaska (Minard and Dunaway 1991). Hook and line sampling methods (angling techniques and effort concentration) need to be standardized between years and between river systems, and validated using an objective sampling method such as electro-fishing, direct observation, traps or weirs.

Recommendations for future surveys include: (1) continued sampling throughout the Refuge to replicate age, weight, and length frequencies for resident species; (2) increasing sample sizes for all resident species; (3) using radio telemetry to determine if rainbow trout in the tributaries are discrete populations; (4) measuring all char captured and sacrificing a sample to determine species, age and maturity; (5) collection and comparison of multiple aging structures (otoliths, scales and fin rays) to assess the potential of using other non-lethal sampling methods that may provide more reliable estimates; and (6) tagging all fish to determine movements, age, and growth of future recaptured fish.

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APPENDIX A - 1996 Sample Sizes and Electronic File Numbers by Species by River.

<u>River</u>	<u>Sampling Method</u>	<u>Number of Fish Sampled</u>	<u>RTS Data File Number</u>
<u>Arolik River</u>			
Rainbow trout	hook & line	324	V0880BA6
Grayling	hook & line	59	V0880BD6
Char	hook & line	50	V0880BB6
Chinook salmon ¹	escapement	15	V0880BC6
<u>Gechiak Creek</u>			
Rainbow trout	hook & line	237	T1400BA6
Grayling	hook & line	5	T1400BB6
Char	hook & line	17	T1400BC6
<u>North Fork Goodnews River</u>			
Chinook salmon ¹	escapement	100	V0040BA6
<u>Kanektok River</u>			
Chinook salmon ¹	escapement	150	V0030BA6
<u>Matogak River</u>			
Char	hook & line	25	T1540BB6
Chinook salmon ¹	escapement	3	T1540BA6
<u>Ongivinuck River</u>			
Rainbow trout	hook & line	2	T1310BC6
Grayling	hook & line	69	T1310BB6
Char	hook & line	53	T1310BA6
<u>Ongoke River</u>			
Grayling	hook & line	152	T1500BB6
Char	hook & line	16	T1500BA6
<u>Osviak River</u>			
Rainbow trout	hook & line	5	T1550BC6
Grayling	hook & line	40	T1550BB6
Char	hook & line	10	T1550BA6
Chinook salmon ¹	escapement	4	T1550BD6
<u>Pungokepuk Creek</u>			
Rainbow trout	hook & line	102	T1320BA6
Grayling	hook & line	24	T1320BB6
Char	hook & line	16	T1320BD6
Northern pike	hook & line	34	T1320BC6

¹ These samples were collected in 1996 but are reported in MacDonald (1997).

APPENDIX B - 1996 Trip Reports by River.

1996 Arolik River Trip Report

Three sampling trips were taken on the Arolik River in 1996. The float trips were from 21-26 June, 24-29 July and 28 August - 1 September. There were a total of 324 rainbow trout, 59 grayling, 50 char and 15 king carcasses sampled between all three trips.

Trip # 1

June 21, 1996 Biological Technician Fisheries (BTF) MacDonald, Fisheries Biologist (FB) Lisac, Refuge Manager (RM) Archibeque, and Project Leader (PL) Larson left Dillingham at 11:15 a.m. in Freshwater Adventure's (FWA) Grumman Goose with Phil Bingman piloting. We arrived at Arolik Lake at 12:20 p.m. The water was low and 9°C. We pulled in to camp at 10:45 p.m. at 59° 30.50N 161° 18.01W. No salmon were seen. Today we sampled 5 rainbow trout and 14 grayling.

June 22, 1996 We began at 11:00 a.m. today. It was a slow day and no salmon were seen today either. The water temperature was 9°C. We pulled in at 8:30 p.m. at 59° 33.91N 161° 29.23W. Today we sampled 34 rainbow trout and 5 grayling.

June 23, 1996 We began at 11:00 a.m. today and pulled in to camp at 8:40 p.m. at 59° 39.12N 161° 38.34W. We started seeing chum salmon in the river. Today we sampled 38 rainbow trout and 5 grayling.

June 24, 1996 We began at 11:00 a.m. and sampled hard all day pulling in at Bessie Creek at 11:00 p.m. There were sockeye, king, and chum salmon in the river. Today we sampled 49 rainbow trout, 9 grayling, and 1 char.

June 25, 1996 From Bessie Creek to the pickup site, it's only a half day float. We started later in the day and ended up at the pickup site at 8:15 p.m. where we camped for the night. Today we sampled 8 rainbow trout and 2 grayling.

June 26, 1996 The boat pickup with Willard Church and Albert Hunter went smooth and we made it over to Quinhagak in about 45 minutes. Freshwater Adventure's Goose arrived and we loaded up and left at 10:55 a.m. Phil Bingman piloted the plane and we arrived in Dillingham at 11:55 a.m.

Trip # 2

July 24, 1996 BTF MacDonald, Biological Technician Wildlife (BTW) Moran and RM Archibeque flew with Lester Bingman in FWA's Goose leaving Dillingham 9:30 a.m. and

arriving at Arolik Lake 10:30 a.m. The Goose then went to Quinhagak to pick up FB Lisac who was in the village. After the plane's arrival we geared up and headed downstream at 11:30 a.m. We made it to the East-South Fork confluence at 8:00 p.m. and camped at the first gravel bar downstream. The water was very low and we had to drag over riffles and rocks the whole way. FB Lisac and BTF MacDonald came face to face with a sandy colored brown bear at about 15 yards in a side channel up the East Fork at 3:30 p.m. Today we sampled 13 rainbow trout, 6 grayling, and 3 char.

July 25, 1996 We began floating at 10:30 a.m. today. We sampled hard all day and pulled in at 11:30 p.m. Today we sampled 54 rainbow trout, 6 grayling, 18 char, and 7 king carcasses.

July 26, 1996 While breaking down camp, Willard Church and Brad and Clint Duncan came upriver in a skiff. They pulled up and we all talked for a while. After they left, we finished taking down camp and began floating at 11:30 a.m. today, pulling in at 9:00 p.m. We pulled in at 59° 38.88N 161° 37.34W. Today we sampled 36 rainbow trout, 10 char, and 2 king carcasses.

July 27, 1996 We began floating at 11:00 a.m. and pulled in at 8:30 p.m. at 59° 40.16N 161° 40.42W. Today we sampled 42 rainbow trout, 4 char, and 3 king carcasses.

July 28, 1996 We headed downstream at 11:00 a.m. and pulled in at 10:30 p.m. at the "Beaver Hole" below Bessie Creek and the island. Today we sampled 26 rainbow trout, 3 char, and 2 king carcasses.

July 29, 1996 We had our pickup set up for the gravel bar at the "Beaver Hole" and waited for the boat's arrival today after breaking down camp. Willard Church and Albert Hunter arrived at 11:57 a.m. We talked, loaded up the gear, and headed out at 12:13 p.m. arriving in Quinhagak at 12:40 p.m. Phil Bingman flew us back to Dillingham in the Goose leaving Quinhagak at 3:55 p.m. and arriving in Dillingham at 4:55 p.m.

Trip #3

August 28, 1996 BTF MacDonald and BTW Moran left Dillingham at 6:30 p.m. in FWA's Goose with pilot Lester Bingman. We arrived at Arolik Lake at 7:15 p.m. Assistant Refuge Manager (ARM) Stovall was in the village of Quinhagak attending a public use meeting and Lester went down to pick her up, arriving back at the lake at 8:15 p.m. We headed downriver to lessen our day tomorrow. We pulled in at 10:15 p.m. due to darkness. Our camp site was at 59° 29.30N 161° 09.12W. There were coho salmon almost to the lake. Today we sampled 1 grayling.

August 29, 1996 We began heading downstream at 9:00 a.m. There were lots of coho salmon and char seen in the river today and the sampling for rainbow trout was very slow. We made it to the East-South Fork confluence at 3:45 p.m. and pulled in to camp at 9:00 p.m. Today we

sampled 8 rainbow trout, 10 grayling, 4 char, and 1 king carcass.

August 30, 1996 We left camp at 10:15 a.m. Again, there were a lot of coho salmon in the river and they seemed to have displaced the rainbow trout. Cohos were just everywhere. A Lund skiff passed us as it traveled upstream at 3:00 p.m. We pulled in to camp at 9:00 p.m. at the raptor nest at 59° 40.28N 161° 40.42W. Today we sampled 5 rainbow trout, 1 grayling, and 7 char.

August 31, 1996 We began floating at 10:00 a.m. Sampling for rainbows was slow and coho salmon were still everywhere. There were 2 weatherports 2 bends above Bessie Creek and a camp of 4 people with 1 raft at the straightaway above Bessie Creek. We made it to Bessie Creek at 2:15 p.m. and to the pickup site at 6:00 p.m. Today we sampled 3 rainbow trout.

September 1, 1996 We had camped at the pickup site last night so all we had to do was take down camp and the raft. Willard Church and Albert Hunter had 2 clients they were taking up the Arolik. They stopped in briefly at 1:30 p.m. Our pickup arrived at 2:00 p.m. We loaded up and left the Arolik River at 2:15 p.m. Our pickup boat was low on oil so we putted in to the village from about half way. Lester in FWA's Goose arrived and we left Quinhagak at 7:30 p.m. and arrived in Dillingham at 8:40 p.m.

1996 Pungokepuk Creek Trip Report

Two sampling trips and an overnight trip were taken on Pungokepuk Creek in 1996. The float trips were from 16-20 May and 19-21 July and the overnight trip was on 5-6 June. A total of 102 rainbow trout, 24 grayling, 16 char, and 34 northern pike were sampled between all three trips.

Trip # 1

May 16, 1996 BTF MacDonald flew with the first load of gear to Pungokepuk Lake with Wildlife Biologist/Pilot (WB/P) Hinkes in the Refuge Cessna 185 leaving Nushagak Bay at 9:40 a.m. and arriving at the lake at 10:10 a.m. WB/P Hinkes left and returned with FB Lisac and the rest of the gear at 12:00 p.m. We went to sample the creek at the east side of the lake. No fish were caught or seen as we fished up the creek. We got back to camp at 4:00 p.m. and sampled our way down to "Rainbow Trout Alley." We got to "RBT Alley" at 9:00 p.m. and sampled till 11:00 p.m. We headed back to camp and arrived at 11:30 p.m. Today we sampled 10 rainbow trout, 3 grayling, 2 char, and 5 northern pike.

May 17, 1996 Radio check at 9:15 a.m. went well. We took the raft around Pungokepuk Lake trolling and fishing the lake and creek outlets. We ended up back at camp at 2:00 p.m. and headed down to "RBT Alley." We began sampling at "Walt's Hole" and left "RBT Alley" at 6:00 p.m. to continue downstream. We went up the first tributary and caught and saw no fish. On the way back to camp we sampled as we went. After returning to camp at the lake, we ate and then sampled Pungokepuk Lake outlet and on down a few bends. FB Lisac saw lots of fish racing in the first long stretch but couldn't catch them for identification. We ended up back in camp at 12:30 a.m. Today we sampled 2 rainbow trout and 6 pike.

May 18, 1996 We began floating at 9:30 a.m. and made it to "RBT Alley" at 5:00 p.m. We pulled in to camp at 9:30 p.m. right below the eagle's nest at 59° 17.38N 159° 58.72W. Today we sampled 10 rainbow trout and 3 grayling.

May 19, 1996 We began floating at 10:30 a.m. and made it to Nicholls Creek at 12:30 p.m. and then the gorge at 1:40 p.m. (the gorge is at 59° 16.93N 160° 00.49W). We pulled in to camp at 10:30 p.m. at 59° 15.63N 160° 11.09W. Today we sampled 21 rainbow trout, and 3 grayling.

May 20, 1996 We had radio check with WB/P Hinkes and floated to the Togiak River. Sampling was slow today. At the Togiak, FB Lisac went out with the first load at 10:30 a.m. in the Refuge Cessna 185. I was on the second and final load at 12:10 p.m. arriving in Dillingham at 12:50 p.m. Today we sampled 4 rainbow trout.

Trip # 2

June 5, 1996 This was a two day trip to Gechiak and Pungokepuk Creeks. FB Lisac, BTF

MacDonald, and WB/P Hinkes sampled Gechiak Creek in the morning through the afternoon. At 4:10 p.m. WB/P Hinkes flew us over to Pungokepuk Lake in the Refuge Cessna 185. We arrived at the lake at 4:20 p.m., set up camp, and then sampled our way down the creek on foot. The water temperature was 16°C. We stayed at the lake tonight. Today we sampled 17 northern pike and no rainbow trout.

June 6, 1996 We sampled our way downstream on foot again today. WB/P Hinkes arrived with the Refuge Cessna 185 at 2:40 p.m. Due to our minimal gear we were all able to fly out together, leaving Pungokepuk Lake at 3:15 p.m. and arriving in Dillingham at 3:45 p.m. Today we sampled 2 rainbow trout and no northern pike.

Trip #3

July 19, 1996 BTF MacDonald and BTW Moran left Dillingham at 3:20 p.m. in FWA's Widgeon with Steve Carter piloting. We arrived at Pungokepuk Lake at 3:40 p.m. There was a single caribou right behind our normal camp spot on the lake. We set up the raft and slowly sampled our way down through the upper creek, "Walt's Hole" and "RBT Alley." We made it to the first tributary at 9:30 p.m. and set up camp. Today we sampled 10 rainbow trout, 1 grayling, and 6 northern pike.

July 20, 1996 We began heading downstream at 9:30 a.m. We saw lots of chum and sockeye salmon in the creek. Some king and pink salmon were present also. We arrived at the gorge at 6:00 p.m. and pulled in later at 10:30 p.m. at 59° 16.64N 160° 03.31W. Today we sampled 20 rainbow trout, 12 grayling, and 8 char.

July 21, 1996 We began heading downstream at 9:30 a.m. and encountered a young bull caribou on the creek at 1:30 p.m. There were two unguided anglers down low fishing the creek and the Togiak River in a 12 ft OMC raft with an 18 hp jet engine. We got to the Togiak River at 7:00 p.m. and decided to call FWA on the satellite phone. They had time and came and got us at 8:15 p.m. We arrived back in Dillingham at 8:45 p.m. Steve Carter was our pilot in the Grumman Widgeon, picking us up at the Togiak River Fishing Adventure guide camp gravel bar. Today we sampled 23 rainbow trout, 2 grayling, and 6 char.

1996 Gechiak Creek Trip Report

Two sampling trips and a day trip were taken on Gechiak Creek in 1996. The float trips were from 24-27 May and 13-16 July and the day trip was on 5 June. There were a total of 237 rainbow trout, 5 grayling, and 17 char sampled between all three trips.

Trip # 1

May 24, 1996 BTF MacDonald and RM Archibeque flew to Gechiak Lake with the first load of gear at 9:30 a.m. with Steve Huddleston in Yute Air's Cessna 206 on amphibis. We arrived at 10:10 a.m. Steve returned with the second load at 1:30 p.m. The water temperature was 5°C. We sampled our way downstream and pulled in at 8:00 p.m. at 59° 21.40N 160° 19.69W. Today we sampled 26 rainbow trout and 5 char. There was slight ice damage to trees lining the creek.

May 25, 1996 We began at 11:00 a.m. today and noticed more ice damage to the trees. It was a very slow day. However, we were able to line the boat through both portages after clearing some brush. At many other places we had to cut and clear brush. We pulled in at 8:30 p.m. at 59° 16.68N 160° 16.75W. The water was 5°C. Today we sampled 5 rainbow trout and 2 char.

May 26, 1996 We took off at 11:00 a.m. today. The water temperature was 5°C. We arrived at the Togiak River at 7:00 p.m. and headed down to the pickup site where we camped for the night. Today we sampled 11 rainbow trout and 4 char.

May 27, 1996 Steve Huddleston came in to pick us up at 12:40 p.m. in Yute Air's Cessna 206 on amphibis. He flew BTF MacDonald with the first load of gear to Togiak, flew back up to get RM Archibeque and then went to Dillingham. BTF MacDonald flew to Dillingham with Norman Coupchiak in a Yute Air Cessna 207 on wheels. We left Togiak at 2:30 p.m. and arrived in Dillingham at 3:15 p.m.

Trip # 2

June 5, 1996 This was a combination day trip at Gechiak Creek and overnight at Pungokepuk Creek. BTF MacDonald and FB Lisac flew with WB/P Hinkes in the Refuge Cessna 185 to Gechiak Lake, leaving Dillingham at 10:00 a.m. arriving at the lake at 10:30 a.m. The water temperature was 14°C. We sampled the upper end of Gechiak Creek on foot for the day. At 4:10 p.m. we left Gechiak Lake for Pungokepuk Lake, where FB Lisac and BTF MacDonald sampled and remained overnight. Today we sampled 21 rainbow trout in Gechiak Creek.

Trip #3

July 13, 1996 BTF MacDonald and FB Lisac left Dillingham at 12:15 p.m. in FWA's Widgeon

with Steve Carter piloting the plane. We arrived at Gechiak Lake at 12:45 p.m. There were lots of sockeye salmon at the lake outlet and in the lake. Chum and king salmon were in also. We sampled our way downstream and pulled in at 10:00 p.m. at 59° 21.40N 160° 19.69W. Today we sampled 43 rainbow trout, 1 grayling, and 1 char.

July 14, 1996 Today we left camp at 10:00 a.m. and arrived at the first portage at 1:20 p.m. We didn't have to portage. We sampled hard all day and pulled in at 11:30 p.m. at 59° 17.57N 160° 16.96W. Today we sampled 72 rainbow trout and 1 grayling.

July 15, 1996 We left camp today at 9:30 a.m. on a clear, sunny, and hot day. We saw a nice bear at 1:30 p.m. that ran off after being startled from the brush on a large gravel bar. We came up to the big grayling hole at 6:00 p.m. and to the guide hole at 8:00 p.m. At the island (9:45 p.m.) we've camped at before, there were 2 Togiak River Fishing Adventure guides up on the rock bluff looking over the creek. We pulled in at 11:30 p.m. at 59° 13.40N 160° 14.99W. Today we sampled 55 rainbow trout, 3 grayling, and 5 char.

July 16, 1996 We left camp at 8:00 a.m. and arrived at the Togiak River at 9:00 a.m. Today we sampled 4 rainbow trout. We floated on down to the pickup site at "Continental Bar" or "The Money Bar." Steve Carter came in FWA's Grumman Widgeon. We left the river at 11:00 a.m. and arrived in Dillingham at 11:30 a.m.

1996 Ongivinuck River Trip Report

Two sampling trips were taken down the Ongivinuck River in 1996: 17-20 June and 31 July - 3 August. Two rainbow trout, 69 grayling and 53 char were sampled during the two trips.

Trip #1

June 17, 1996 BTF MacDonald left Dillingham at 10:45 a.m. with WB/P Hinkes piloting the Refuge Cessna 185, arriving at Ongivinuck Lake at 11:15 a.m. BTF MacDonald set up the raft and sampled the upper river. FB Lisac arrived at 4:15 p.m. in FWA's Grumman Widgeon with Lester Bingman piloting. Upon his arrival we began downstream. We pulled in at 10:30 p.m. at 59° 33.57N 159° 25.28W. Today we sampled 14 grayling, 1 char, and no rainbow trout.

June 18, 1996 No notes for today. We sampled 22 grayling and 7 char.

June 19, 1996 We sampled hard all day and were surprised to reach the Togiak River at 7:30 p.m. We motored down to the pickup site with a 25 hp Johnson engine. We arrived at the pickup site at 8:30 p.m. and set up camp. Today we sampled 5 char.

June 20, 1996 We left the Togiak River at 10:45 a.m. in FWA's Widgeon with Lester piloting the plane. We arrived in Dillingham at 11:35 a.m. No fish were sampled today.

Trip # 2

July 31, 1996 BTF MacDonald and BTW Moran left Dillingham at 4:00 p.m. with Lester Bingman piloting FWA's Grumman Goose. We arrived at Ongivinuck Lake at 4:20 p.m. After setting up the rafts and beginning downstream we noted 2 canvas canoes and 2 tents at the lake outlet. We could hear the people in their tents and they stepped out just as we went out of sight. We pulled in to camp at 9:30 p.m. at 59° 33.58N 159° 25.35W. We saw sockeye, chum, and pink salmon today. Today we sampled 4 grayling and 1 char.

August 1, 1996 We left at 9:30 a.m. and pulled in to camp at 9:30 p.m. We saw chinook salmon today in the river. Today we sampled 14 grayling and 10 char.

August 2, 1996 We left camp at 9:30 a.m. and sampled hard all day. We saw a sow brown bear with 2 cubs in the "valley" and a group of 8 caribou on top of a mountain ridge on the west side of the "valley." Later in the day we came upon a single caribou. Towards dusk, we saw 5 separate bears in a matter of a half hour. We pulled in at 11:30 p.m. at 59° 22.52N 159° 47.32W. Today we sampled 2 rainbow trout, 15 grayling, and 25 char.

August 3, 1996 We left camp at 10:30 a.m. and encountered the main Togiak River at 11:15 a.m. We then floated down to the pickup site which we came upon at 2:00 p.m. We left the Togiak River at 4:00 p.m. and arrived in Dillingham at 4:35 p.m. Today 4 char were sampled.

1996 Ongoke River Trip Report

From 9-11 July 1996 a sampling trip down the Ongoke River was taken. There were 152 grayling and 16 char sampled.

July 9, 1996 BTF MacDonald flew to "Ongoke Lake" with WB/P Hinkes in the Refuge Cessna 185 leaving Dillingham at 9:50 a.m. and arriving at the lake at 10:10 a.m. We tested the satellite phone and it worked fine. While WB/P Hinkes went back to town for the second load of gear BTF MacDonald portaged gear over to the Ongoke River about 200-300 yards. The second flight arrived with WB/P Hinkes flying in FB Lisac. We carried the last of the gear over to the river, set up the raft, and began floating at 1:00 p.m. We pulled in at 10:15 p.m. at 59° 14.88N 159° 24.77W. Throughout the day we saw 100's of sockeye salmon, and a handful of king and chum salmon. One beaver dam crossed the river and we had to go over it. We saw lots of caribou, moose, bear, otter, mink, and beaver sign. Today we sampled 15 grayling and 12 char.

July 10, 1996 We began floating at 10:00 a.m. It rained hard all day. About 30 grayling were caught in one spot while sampling from 7-9 p.m. At 11:00 p.m. we came upon a beautiful gorge. We pulled in below the gorge at midnight at 59° 11.81N 159° 21.55W. Today we sampled 58 grayling and 1 char.

July 11, 1996 We left camp at 10:30 a.m. We saw 10-20 king salmon at 12 noon and arrived at the confluence of the Ualik Lake outlet at 6:30 p.m. We had an 8:00 p.m. pickup in Amanka Lake so we began rowing hard for the lake. Sampling slowed down to almost none at this time. We got to Amanka Lake at 8:30 p.m. and waited for our pickup which came at 9:00 p.m. Amanka Lake was shallow and muddy at the outlet of the Ongoke River. We left Amanka Lake in FWA's Widgeon with Steve Carter piloting the plane at 9:25 p.m. and arrived in Dillingham at 9:40 p.m. Today we sampled 79 grayling, and 3 char.

1996 Matogak River Trip Report

From 20-23 August 1996 a sampling trip down the Matogak River was taken. There were 25 char and 3 escapement kings sampled.

August 20, 1996 FB Lisac and Wildlife Biologist (WB) Aderman left Dillingham at 9:30 a.m. via Tucker Aviation's Cessna 207 heading to the village of Togiak. From there, Yukon Aviation's Bell 206 helicopter took them to the Matogak River arriving at 11:57 a.m. at 59° 11.08N 160° 45.88W. The raft was set up and loaded by 12:40 p.m. The Conductivity was 8 microS/cm (1999 scale) and the temperature was 7°C. The first sockeye salmon were seen at 59° 09.89N 160° 47.22W. The river was narrow (15-40 ft) with a depth from inches to 8 ft (mean 1 ft). It was skinny and sterile, looking to have a good pool/riffle ratio with cover and undercut banks sufficient to hold small fish but none were found. The substrate ranged from primarily small gravel and sand to large cobble. Today we observed <30 sockeye, 2 king, and 1 chum salmon, and char (around 300). Carcasses were very decomposed. Appears as though there was recent, sufficient high water which left carcasses high on gravel. Char were in schools and colored up. It may be close to spawning judging by their behavior. One mortality, a female, had a swollen ovipositor, well developed and loose eggs. Char did not readily take egg pattern flies, but did hit spinners. Mayfly and stonefly adults and stonefly and caddis larvae were seen. Camp was made at 59° 06.87N 160° 47.42W. Today we sampled 10 char and 2 chinook salmon.

August 21, 1996 The river at the camp site is 36 ft wide by 1.5 ft mean depth. The maximum depth is about 30 inches. High water mark is at 60 ft wide. The substrate is predominantly large cobble and boulders. Several braided stretches required walking the raft. Habitat looked good for grayling. Thick algae growth over most underwater surfaces. Current was swift. Water still so low and clear that char were spooked easily. The river increased in width, but the channel became more uniform with no cut banks. Very few fish, other than coho salmon seen in second half of day. The cohos were primarily in big holes. Fishing is still very poor. We struggled to catch char and had to use a spinner to get any strikes. A char was suspected to be digging a redd today. There were the normal char flashes, but this one fish was too consistent and persistent in it's movements. By noon hadn't caught a fish, but saw 30 sockeye salmon, 10 chum salmon, 1 pink salmon, 25 king salmon, 10 coho salmon, and 25 char. Camp was made at 59° 04.53N 160° 48.32W. The water temperature was 9°C (43° F). Camp was made at 58° 59.87N 160° 49.96W. Today 12 char and 1 escapement king were sampled. At 7:18 p.m. at 59° 01.18N 160° 48.75W king carcasses were encountered. This was just below the first big silver hole (~200 SS) and saw juvenile sculpins in a puddle on a gravel bar. At 7:46 p.m. we arrived at the trib at 59° 00.91N 160° 49.54W.

August 22, 1996 It was difficult to fish and not catch a coho salmon. Many pink salmon were seen with a few char mixed in. Coho salmon were in big holes and in some long deep strait stretches. The river width was over 200 ft but no channel in most areas and there were high rock faces up to 50 ft high. The lower 4 miles of the river has high banks with no gravel for camping. We reached the tidal area at 9:30 p.m. with an incoming tide and outgoing wind. We rowed

around the west point at the bay to a beach and then walked to the first tributary where we thought Bay Air would pick us up. Camp was made just west of the Matogak River mouth. Three char were sampled today.

August 23, 1996 We actually didn't go far enough and should have gone to the next large beach to the west. The pick up went well since there was no wind. We walked the raft out to the DeHavilland Beaver and loaded off the raft. We returned to Dillingham by noon.

Summary of wildlife observations along the Matogak River - Raptor nest observations

Two unoccupied stick nests and a third site were located on rock outcrops. All nests were located while floating down the river. The first nest was located at 59° 06.76N 160° 47.60W on a rock face approximately 40 ft above the water and 10 ft below the tundra on the west side. This site appeared to be accessible by foxes. Several photographs were taken of this site. The second stick nest and the third potential site were located approximately 100 yards apart at 58° 54.62N 160° 54.37W. Both sites were about 30 ft above the water and 15 ft down from the top edge of the rock face on the east side of the river. Six other rock outcrops along the river have potential for nest sites, however, no other nests were observed.

Waterfowl observations Seven species of waterfowl were recorded. Most prevalent were harlequin ducks followed by red-breasted mergansers and mallards. Other waterfowl observed included tundra swans, green-winged teal, northern pintails, and northern shovelers. Eight harlequin broods (chicks: 4, 3, 6, 4, 6, 5, 3, 6) were encountered while four red-breasted merganser broods (chicks: 6, 8, 5, 7) were observed. Harlequin ducks were seen from start to finish and it was not uncommon to see more than 15 birds downstream at any given time. Until we reached the lower river (58° 54.62N 160° 54.37W) most harlequin ducks and red-breasted mergansers were "pushed" downstream several miles, making identifying new birds difficult.

Mammals Caribou tracks were seen in several places along the shore. One bull was seen along the river while we were being flown to the starting point. A shed antler was found in the river near the end of the first day. Moose tracks and droppings were observed in a couple locations. Browsing on willows was not noted. Brown bear sign (tracks, trails, scat, and feeding areas) was prevalent the entire float, but no bears were seen. The few short excursions we made away from the river revealed an absence of berries, similar to other reports and observations throughout the Refuge. Beaver sign was evident from start to finish. Beaver dams across small tributary streams along with 3 active lodges along the Matogak River were seen. Two separate sightings of mink were made. Also, two juvenile red foxes were observed. Two harbor seals were observed feeding in the mouth of the Matogak River on the evening of the 22nd (high tide).

Other observations Human sign was limited. A pop can was stuck on a willow branch which we left. A short distance downstream from the pop can we retrieved a snow machine windshield. In the lower river a subsistence fishing net was piled up along shore. Two cabins were observed. One was located on the east bank across from the confluence of the Nisua River and the second cabin was on the west bank at the mouth of the Matogak River.

1996 Osviak River Trip Report

The Osviak River was sampled for resident and anadromous fish species from 20-24 August 1996 by BTW Moran and Expeditor Mummau. All five species of salmon, rainbow trout, Arctic grayling, and char were present in the river (unknown species of sculpin and lamprey were also present). Caribou, brown bear, red fox, and beaver sign were present throughout. River otter and mink tracks were found in the lower river.

The upper river was narrow but easily floated. It may have been possible to start further upstream without much difficulty. The river was slow with a small gravel substrate, especially in the lower river. A tributary entering the river at approximately 59° 0.52N 161° 07.24W decreased the clarity of the water and covered the gravel with a brown sediment. Below this point grayling numbers diminished. Good camping gravel bars were numerous throughout. There were no significant sweepers, rocks, or rapids. However, if water levels were much lower extensive dragging may be required.

20 August, 1996 This trip began after BTW Moran, Maintenance Worker Doyle and Expeditor Mummau slung barrels of fuel from Hagemeister Island to Tongue Point using Yukon Aviation's Jet Ranger helicopter (pilot Tom Ratledge). At 7:00 p.m. Moran and Mummau departed Togiak for Tongue Point to retrieve float gear and continue to the Osviak River. Moran and Mummau arrived on the river at 10:00 p.m. and set up camp at 58° 02.98N 161° 06.34W. Five grayling and one char were sampled near camp. Sockeye, chum, pink, and king salmon were also present near camp. One Harlequin duck brood with three chicks was observed.

21 August, 1996 We fished around camp until 9:45 a.m. and then started down river until 9:00 p.m. Thirty-three grayling, one rainbow trout, and six char were sampled, and the first silver salmon of the trip was caught. One Harlequin duck brood with five chicks and one red-breasted merganser brood with 15 chicks were observed. Camp was set up at 58° 58.54N 161° 10.10W.

22 August, 1996 One sculpin was caught in the minnow trap baited with steak bones set on the edge of a gravel bar. We departed camp at 9:55 a.m. Two grayling, four rainbow trout, three char, and four spawned out kings were sampled. Coho salmon are becoming more common in the river. Camp was set up at 58° 50.36N 161° 13.20W at 9:00 p.m. The air temperature was 8.5°C and water temperature was 11.0°C. A medium sized stick nest was found in a snag at 58° 58.54N 161° 10.82W.

23 August, 1996 One lamprey, two sculpin, and 18 king smolt were caught in a minnow trap baited with pork chop scraps set against a grassy bank. We departed camp at 10:10 a.m. and arrived at the pick up site in Osviak Bay at 5:00 p.m. One escapement king salmon was sampled. Coho salmon were extremely abundant in the lower river and all exceeded our 12 lb. scale.

24 August, 1996 At 11:30 a.m. we were picked up by Rick Grant (Beaver on floats) below the highest part across from the western-most fish camp.

APPENDIX C - 1996 Anadromous Stream Catalog Nominations

Submissions to the Alaska Department of Fish and Game's Atlas of Waters Important to the Spawning, Rearing or Migration of Anadromous Fishes.

Ongoke River

Anadromous Waters Catalog (AWC) Volume: Southwestern Region
USGS Quad: Goodnews Bay A-2 and A-1
Anadromous Waters Catalog Number of Waterway: 325-10-10010-2071
ADFG Nomination Number: 97-246

Species	Date (s) Observed	Spawning	Rearing	Migration	Anadromous
Chum salmon	7/9/96	5 - 10			XX
Chinook salmon	7/11/96	10 - 20			XX

A raft trip down the Ongoke River was performed to sample resident fish species for age, weight, and length with hook and line. A "handful" of chum salmon were observed at 59° 14.88N 159° 24.77W. Two days later 10-20 chinook salmon were observed at 59° 11.81N 159° 21.55W.

These species for nomination were observed by Rob MacDonald, Fisheries Biological Technician and submitted to ADFG on 23 January 1997.

Osviak River

Anadromous Waters Catalog (AWC) Volume: Southwestern Region
USGS Quad: Goodnews Bay A-6
Anadromous Waters Catalog Number of Waterway: 326-30-10500
ADFG Nomination Number: 97-245

Species	Date (s) Observed	Spawning	Rearing	Migration	Anadromous
Sockeye salmon	8/20/96	present			XX

A raft trip down the Osviak River was performed. The crew was dropped off by helicopter at 59° 02.98N 161° 06.34W. Sockeye, chum, pink, and chinook salmon were present at this point. This trip was to sample resident species for age, weight, and length with hook and line.

This species for nomination was observed by John Moran, Wildlife Biological Technician and submitted to ADFG on 23 January 1997.